Interim Report

Nebraska Network Workgroup
Of the
Nebraska Information Technology Commission

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http://nitc.nol.org/nitc/network/

Prepared by the

Office of the Nebraska Information Technology Commission

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NOTE: Staff of the NITC prepared this interim report. It has not undergone formal review and adoption by the Nebraska Network Workgroup. Part or all of the content is subject to corrections and other changes.

Draft Interim Report
Nebraska Network Workgroup

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A. Background

The NITC established the Nebraska Network Workgroup "to evaluate the feasibility of the development of a digital network and related support functions to serve education, communities, and state government that could be accomplished through a statewide consortium." Membership on the workgroup includes representatives of higher education, K-12 schools, Education Service Units (ESUs), telehealth providers, libraries, local government, state government and the NITC Technical Panel. The Office of the NITC is providing staff support for the study. Agendas, minutes, and supporting material are available on the website for the workgroup: (http://nitc.nol.org/nitc/network/).

As described in the workgroup charter, the Nebraska Network addresses the management of communications networks rather just aggregating the acquisition of telecommunications services, which is the focus of the NETCOM project (http://www.doc.state.ne.us/netcom/index.html).

The charter for the workgroup set forth ten objectives:

1. Report on the strengths and deficiencies of existing telecommunications networks serving state and local public sector entities;
2. Examine the strengths, weaknesses, opportunities, and risks pertaining to the concept of a statewide digital network;
3. Basic requirements and critical success factors for a statewide digital network;
4. Address security issues related to a statewide digital network;
5. Evaluate different models for implementing a statewide consortium, including participation, governance, and operational authority;
6. Solicit suggestions and comments from affected entities;
7. Report findings and recommendations, including relationship to NETCOM and incremental options for consideration by the NITC;
8. Prepare a business case and estimate of fiscal impact for all recommendations and options;
9. Report on different funding models and strategies and the corresponding levels of service;
10. If needed to attain the goals listed above in an efficient manner, develop a set of statutory changes for consideration by the NITC for recommendation to the Governor and Legislature.

The work plan included the following steps and timeline:

February:	Review Existing Networks and Identify Strengths and Weaknesses
March:	Identify Goals, Objectives, and High Level Requirements
April:	Review Model Networks in Other States
May:	Develop Business Case
June:	Prepare Draft Report (Including Opportunity for Public Comment)
July:	Review, Revise and Adopt Draft Final Report
August:	Present Draft Final Report to NITC Councils and Tech Panel
September:	Present Final Report to the NITC

B. Definition

The term, "network", has a wide range of meanings, encompassing the Internet, digital connections between two or more computers, and even an informal alliance among

people who stay in contact with each other. Digital networks may be local in scope (local area network – LAN). They may connect multiple buildings in close proximity (campus network) or scattered around a city (municipal area network – MAN). Digital networks may cover large distances (wide area network – WAN).

The focus of the Nebraska Network workgroup is on the last category.

C. Summary of Existing Networks

Networks permit the easy exchange of electronic information. Networks may serve voice, video, or data functions, or a combination of all three. Networks arose in response to specific requirements of agencies. A few examples include the Nebraska law enforcement network connecting local sheriffs and police departments to the State Patrol's databases, the county automation network providing state applications to county offices, regional distance education consortia, the state's extensive satellite system for distance education, and the University's network connecting different campuses and county extension offices.

Several factors have promoted an ad hoc approach to building networks. The need for a network typically arises from a single sponsor with a specific application, such as those listed above. By necessity, the sponsor limits the scope of the network to specific requirements that serve the sponsor's responsibilities. In addition, the application determines the points to be connected, capacity requirements, and sometimes even the technology that can be used. Even when sharing a network is technically possible, concerns about security or conflicting use between applications may require isolated circuits. Funding is also a factor, because the sponsoring organization may face legal restrictions that make it difficult to share network costs. Federal OMB cost allocation regulations is one example. The e-rate program of the Federal Communications Commission is another example. Technology also impedes sharing resources, when sponsors develop networks without the benefit of unifying standards. The regional distance education consortia are an example, because the absence of a common standard prevents different regions from exchanging distance education classes. Finally, technical requirements for some applications or computers may dictate specific communications protocols, which are incompatible with other systems.

At least 9 public entities operate about 30 statewide or regional networks. This number is not precise, because there is some variation among agencies in what constitutes a separate network. These numbers do not include many entities that operate local or campus networks within a small geographic area. In addition, to these numbers, twelve regional distance education consortia provide video and data services to a total of 289 high schools. Each distance education consortia is associated with one or more Education Service Unit (ESU).

A list of networks is included in the appendix. More detailed information is available on the workgroup's website (http://nitc.nol.org/nitc/network/). Location information for each network is being entered into a GIS application to permit easier display and analysis.

Organizations that support the most networks include:

Department of Administrative Service
Nebraska Education Telecommunications
University of Nebraska

More networks are being created. The Military Department is building a "Distributed Training Network, which will carry video and audio teleconferencing, Internet, and other applications. It will be part of a larger federal infrastructure and will connect eight sites in Nebraska. The Department of Health and Human Services faces a federal mandate to insure high-speed connectivity with public health departments, healthcare organizations, law enforcement agencies, and public officials. Possible uses of the "Health Alert Network" include providing Internet access, distributing critical health information to health care entities, and supporting automated exchange of clinical and lab data for event detection.

The Department of Roads, Nebraska Emergency Management Agency, and the State Patrol are planning a "joint operations center", which will include some network functions. The joint operations center (JOC) will include aspects of a network operations center for managing the Department of Roads "Intelligent Transportation System" and other communications requirements of the JOC.

The Nebraska Legislature is considering LB 1211, which would authorize a statewide public safety communications system. A critical piece of the system would be a network operations center.

The original NETCOM RFP included detailed requirements for a network operations center, which would be responsible for management and quality assurance of aggregated telecommunications capacity serving a broad range of end users.

D. Report on Strengths and Weaknesses of Existing Networks

Strengths. A clear strength of the existing environment is the number of networks that exist and the state's telecommunications infrastructure that makes these networks possible. Nebraska's telecommunications companies and other entities have made major investments in installing the physical infrastructure such as fiber optic cable that forms the basic foundation for building digital networks. The extent and wide distribution of the physical layer has greatly facilitated the development of networks wherever they have been needed within the state.

Another strength is the technological expertise that different entities have assembled to manage existing networks. The knowledge, skills, and willingness to communicate and provide assistance to others represent a major advantage.

The existing structure provides a high level of responsiveness to users, and the NITC provides a means for encouraging collaboration.

Weaknesses. A major weakness is the lack of a vision and strategic direction for building and using networks in the state. At present, there is no high level champion who serves the role of an advocate for the benefits of developing a unified network.

Lack of consolidation is another weakness that leads to a number of shortcomings. These include underutilization of existing networks, thus realizing less than optimum value from investments, problems of interoperability, and lack of market power when negotiating with providers. At times, concerns about institutional control impede cooperation. Fragmentation also makes it harder for existing networks to stay current with changes in technology.

Another weakness is the general absence of interconnectivity among video networks. This includes the lack of seamless scheduling for participating entities. Although the NITC recently adopted two video standards, considerable work is needed to on a migration plan and scheduling issues.

External constraints are also a weakness. LATA issues add complexity and cost to some networks. Real or perceived statutory barriers preclude some options and effective action in some circumstances.

Opportunities for Improved Services and Increased Efficiency. The demand for new networks and new services offer an opportunity to reassess the best means for delivering services and achieving efficiency. Homeland Security, the proposed Health Alert Network, network support for the state's new accounting and human resource system (NIS), and expansion of Internet 2 are examples.

Entities external to Nebraska also offer new opportunities for aggregating purchasing power. The National Tele-Ed Alliance is one service that could be tapped. Interest in rural development should reinforce attention to better collaboration on network issues. In the same way, issues relating to rural health, access to e-government services, access to educational services for lifelong learning, and access to digital library services require widespread connectivity and robust networks. Good collaboration on networks makes it possible to transcend organizational boundaries for delivery of services.

Challenges to Network Development. Finding champions at all levels of government and communicating a vision and concept for managing networks pose the biggest challenges to future development. Gaining consensus and getting cooperation and acceptance are necessary conditions for success, which will be hard to achieve. Funding, overcoming policy barriers, and preparing a plan to share with policy makers are other challenges. Implementation issues such as migration plans, choosing private partners, and making decisions on specific technologies are other difficult matters.

E. Summary of Objectives for a Nebraska Network

The March 14, 2002, meeting of the Nebraska Network workgroup focused in identifying potential goals and objectives that greater collaboration should serve. Out of an initial list of 28 objectives, the workgroup identified twelve key issues and ranked them in order of priority.

Enabling the seamless flow of all types of information shared top billing on the list of priorities. This requires statewide compatibility of systems, which is essential for improving the value of networks.

Another major task is to document a strong business case for greater collaboration or possible consolidation of networks. This entails communicating both the vision and measurable benefits of statewide access to systems. Identifying potential utilization of a statewide infrastructure to serve multiple applications is a logical part of developing a strong justification for a unified system. Providing support for Homeland Security and achieving efficient utilization of resources were separate objectives that also buttress the business case.

The workgroup listed several operational issues as very important objectives. These include:

- Creating a network operations center to manage multiple systems and provide customer service;
- Defining a governance structure to oversee resources;
- Overcoming policy barriers; and
- Insuring the full range of security protections.

As an objective, the workgroup felt that it was important to "exclude no one, unless unique requirements or policy/geographic barriers exist." The workgroup also believes that encouraging competition and promoting equal treatment of providers should be objectives.

F. Potential Participants and Stakeholders

Network work group members discussed the issue of participants and stakeholders at length. The group is uncertain who to include and who to exclude. There was discussion concerning the involvement of private profit or non-profit entities and organizations. Such entities could include, but are not limited to hospitals, nursing homes, and school districts.

Potential services or involvement could include, but are not limited to; Internet, Internet 2, Distance Learning, Email, Tech Support, Video Conferencing, Scheduling System, Web Server, File Print Service, Healthcare, Urban and Rural Schools, Electronic Data Sets (benefiting libraries), both synchronous and asynchronous services.

Some members of the workgroup cited multiple reasons for initially taking a broad, inclusive approach to determining participants and scope of a statewide network. First, when voice, video and data are all in digital format, there is little or no distinction in the underlying technology. Second, a mix of technologies will often be required to serve an application or function. For example, the public safety wireless system will include a substantial landline component. Third, networking technology that supports one application may have other potential uses, which would generate additional value for the investment. The opportunity to use digital TV spectrum for other data applications is an example. Finally, there are some issues like security that are common to all networks.

G. Evaluation of Other States' Networks

At the April 4 meeting, the workgroup evaluated statewide networks in nine states. The states were chosen to serve as a selective sample of the many different types of existing statewide networks. A summary of each network is on the workgroup's website. The NETCOM technical advisory group also provided a technical assessment of each model.

COLORADO. The Colorado Multi-Use Network (MNT) project is a partnership between the State of Colorado and Qwest to build a high-speed fiber-optic network linking rural and urban Colorado. The State will aggregate Colorado State government agency telecommunication requirements from its current multiple networks into a single network to reduce administrative and maintenance costs to the State. As anchor tenant, the State's investment will help leverage the development of telecommunications infrastructure and expand delivery of advanced services to all geographic regions of the state using a system of 70 aggregation points. The MNT is being implemented in three phases that began in June 2000 and will be completed in 2003.

Currently, the MNT has assessed a 23% telecommunications surcharge to all State agencies to help finance the MNT and has further been unable to convert most K-12 education entities to the MNT due to the inability of staff to file a successful e-rate application. The state's network staff is working hard to encourage application layer development to ride atop the MNT Network. Qwest has a contract to provide the services of a network operations center from its Minnesota office. Ongoing funding is estimated at $13 million per year. Estimated state employee FTE is 12 plus contracted services.

INDIANA. The Indiana Higher Education Telecommunication System (IHETS) was created in 1967 by the Indiana General Assembly to permit sharing of educational resources via technology. Its members are Indiana's seven public and 31 private colleges and universities. Partners include K12 schools, public libraries, state government, and public broadcasting. IHETS Services and Operations include the Indiana Telecommunications Network (ITN) which now serves more than 600 college campuses, K-12 schools, Learning Centers, libraries, and state government offices. IHETS also manages a satellite-based television network, an Audio and Video Conferencing Bridge, and an inter-campus telephone network that handles over 13 million minutes of long distance telephone calls each year. IHETS also supplies Integrated Network Services that assists member institutions in linking technological capabilities with the needs of users.

Currently, the ITN is facing severe funding shortfalls with costs expected to escalate. IHETS receives $7.3 million per year to subsidize operations. The ongoing costs that were retrieved from the ITN Website are many times the costs of Nebraska rates. The telecommunications partners providing the ITN are ATT and Ameritech. Estimated IHETS and ITN FTE estimate is 95.

IOWA. The Iowa Communications Network (ICN) is a state agency that administers a statewide fiber optics network. Authorized users are identified by the Code of Iowa Chapter 8D. Authorized users include: All accredited K-12 school districts and private schools in the State, all accredited public and private colleges and technical educational institutions, all State Agencies, all Federal Agencies including National Guard Armories, the United States Post Office, hospitals and physician clinics (video and data services only), and public libraries. ICN currently supports 1400+ entities from the list above. They currently support over 800 full-motion automated classrooms. They provide 300,000 hours of video per year and 5000+ hours of classroom access per week in 1400 sessions. Clients are free to use ICN or any other provider keeping prices competitive. The ICN video and data connections are organized around their 16 Area Education Agencies that are similar to Nebraska's ESUs.

Currently, the ICN is expected to reach financial and operational self-sufficiency in 2007. Original construction costs exceeded $200 million. Over the past 12 years, the ICN has received an estimated $156 million in Federal funds for test bed activities. The State currently subsidizes video service at the rate of $2.2 million, which is expected to be phased out. The ICN offers a variety of services including voice, video and data-Internet 1. The ICN was built originally because the telecommunication companies were unwilling to provide the network and not interested in reaching to rural areas. Estimated state employee FTE is in excess of 150, with 95 FTE in the ICN network operations center.

KANSAS. The Kansas Research and Education Network (KanREN) is a non-profit consortium of colleges, universities, school districts, libraries and other organizations in Kansas, organized to provide statewide network connectivity of data and Internet1 in support of education and research. KanREN includes 9 regents state colleges and universities, 12 community colleges, 11 private universities, 14 school districts, and 5 other organizations that are education-related. Membership in the KanREN consortium is open to any Kansas college, university, school district, library, or educational consortium. Other non-profit organizations may qualify for KanREN membership as well, subject to the approval of the KanREN Executive Committee. Most KanREN member institutions also obtain dedicated Internet connections via the KanREN statewide network backbone. The KanREN consortium operates a statewide backbone network utilizing the Internet protocols (IP), with multiple connections to the Internet. This network also provides Internet 2 connectivity for member institutions that belong to the Internet 2 consortium.

Currently, KanREN is completely funded by membership and connection fees paid by its member institutions. Annual operational costs were unavailable at this time. The KanREN Network Operations

Center is contracted to the University of Kansas. A funding initiative (called KAN-ED) before the Kansas Legislature is asking for an additional $10 million to connect schools and libraries up to the KanREN backbone. Estimated KanREN FTE is 4 plus contracted services.

MISSOURI. The Missouri Research and Education Network (MOREnet) is affiliated with the University of Missouri and is Missouri's not-for-profit electronic information network. MOREnet serves 71 higher education institutions, 512 elementary and secondary education school districts, 121 public libraries, all state agencies, and other organizations and government agencies in Missouri. MOREnet is comprised of several projects and programs serving these various groups. The Missouri Educational Research Consortium (MERC) serves public higher education institutions. The Affiliates Program serves all the organizations that MERC does not serve, including private K-12 schools and libraries, non-profit organizations and similar organizations not eligible for other MOREnet-managed programs. MOREnet provides high-speed, reliable Internet access to the state's public sector. In addition to Internet connectivity, MOREnet provides training and technical support, online reference resources, opportunities to converse with colleagues in technical and topical discussion lists, security education and assistance, and videoconferencing.

Currently, MOREnet derives approximately $27.1 million yearly from Core funding ($12.1), Elementary and Secondary Education ($6.4), State Libraries ($3.3), and Organization Fees ($5.2). Initial funding and implementation included approximately $33 million from various funding sources within and outside Missouri. E-rate reimburses another $7.5 million that is used mainly to fund Grades 3-4 e-MINTS high-tech classrooms. Fees are assessed for e-mail service and web page hosting. Estimated MOREnet employee FTE is 140.

NORTH DAKOTA. The Statewide Technology Access for Government and Education Network (STAGEnet) is the official name for North Dakota's statewide network. The STS (SENDIT Technology Services) serves as a liaison between schools and the Information Technology Department. The State Information Technology Department (ITD) is responsible for STAGEnet infrastructure. The Information Technology Department (ITD), overseen by the State CIO, is responsible for all wide area network services planning, selection, and implementation for all state agencies, including institutions under the control of the State Board of Higher Education, counties, cities, and school districts. ITD is also responsible for computer support services, software development, statewide communications services, standards for providing information to other state agencies and the public through the Internet, technology planning, process redesign and quality assurance. ITD has broad responsibilities to all state agencies and the citizens of the state in building a secure statewide area network providing for the aggregation of data, voice, video, and multimedia into a backbone insuring functionality. The development of the state wide area network is coordinated with the North Dakota University System.

Currently, STAGEnet receives some support from the Legislature to offer services. The main contractor was thought to be a consortium of small independent telephone companies although Qwest is mentioned on the STAGEnet Website. Telecommunications Services takes care of telephone systems and services, video services, network infrastructure, and help desk support. Estimated state employee FTE is 22.

OKLAHOMA. OneNet, Oklahoma's telecommunications and information network for education and government is a Division of the Oklahoma State Regents for Higher Education operated in cooperation with the Oklahoma Office of State Finance. This comprehensive network is utilizing fiber optics and wireless technologies to transmit video, voice and data throughout Oklahoma. OneNet is not a state-owned utility, but rather a state-lead partnership among telecommunications companies, equipment manufacturers and service providers. Upon its implementation, OneNet focused on establishing the necessary hub sites throughout Oklahoma to provide the infrastructure necessary to support the high-speed telecommunications network. In addition, it moved aggressively to establish an equitable rate structure and enroll customers. This electronic linkage is made possible through a partnership between the State of Oklahoma and private telecommunications companies--enabling OneNet to negotiate reduced rates and utilize established, private communications networks. OneNet's state-of-the-art technology and staff currently provide high-speed communications to a variety of Oklahoma entities such as: public and vocational-technical schools;

colleges and universities; public libraries; local, tribal, state and federal governments; court systems; rural health care delivery systems; and programs engaged in research.

Currently, OneNet is in the process of converting video transmission to the H.323 standard. Original state capital support for construction of OneNet was $14 million. Pricing for ongoing and service costs for participating entities is not as favorable as Nebraska. Estimated state and university employee FTE is 60.

SOUTH DAKOTA. The Digital Dakota Network (DDN) is a state-supported digital communication system that delivers high-speed data connectivity to all public schools in South Dakota. In addition, the DDN Video delivers high-quality video conferencing capabilities to high/middle school facilities within South Dakota. This system, created by Governor William Janklow, is a cooperative effort between the state of South Dakota and private corporate contributions. The objectives of the DDN Video are to provide a seamless statewide educational delivery system. Benefits of using the DDN Video include sharing educational resources; broadening course offerings; allowing teacher collaboration; saving time, travel and other resources; and removing geographic barriers. The DDN video equipment is intended for use in K-12 education. One of DDN's claims to fame is that the actual wiring of schools occurred over an 18-month period using prison labor with completely standardized equipment throughout the entire system. Major providers are Qwest and Verio and a third provider is sought for additional Internet provision. Six public universities and one private university currently participate in Internet2. Qwest contributed $17 million to the original startup with the State contributing $12 million.

Currently, ongoing costs are estimated at $9 million and services are provided at no cost to the schools. State government and higher education services are mentioned but not detailed as to how they ride the state network, only that there are 30 university and 300 state government circuits. The management of the network is definitely a top-down approach and the Bureau of Information Technology and the State CIO are principally responsible. The nonprofit entity, Technology and Innovations in Education (TIE), handles all the teacher and administrator technology training with support from the Dept of Education and Cultural Affairs and member school contributions. Estimated state employee FTE supporting the DDN is 19.

WYOMING. The Wyoming Equality Network (WEN) is a statewide, high-speed data and video network that connects all Wyoming public schools and gives communities capability for telemedicine, economic development and community outreach applications as well as access to the Internet. The WEN was created through the state's agreement with Qwest and enabled the state to provide telecommunications capabilities to schools and related entities. In addition, WEN is an ATM backbone connecting 3 com switches. The Wyoming Department of Education (WDE) is essentially the "owner" of the network. Wyoming's Department of Administration and Information (A & I) provides central support to the state and will act as the intermediary between the school district and their main provider for purposes of ordering and making payments for enhancements and Qwest Internet access service. The Information Technology Division (ITD) provides MIS applications, computer center, and telecommunications support for the state. ITD manages the network, bills WDE for services when appropriate and serves as the collection agent for WEN. The A & I Telecommunications Division manages the scheduling of video conferencing, bills entities for services provided, and oversees the contract with their main provider, Qwest. The WEN supports all schools via their intranet. There are 48 school districts in Wyoming. Schools include all grade schools, middle schools, high schools, junior/community colleges and universities. Any entity wanting to connect to the WEN needs to have permission from the Network/Security Policy Group. The entity wanting access needs to be sure that it is in compliance to all standards of the network. Network operation, network management and monitoring are maintained by Qwest Network Management Services out of Minneapolis. Their services include, but are not limited to, mapping, trouble tickets, performance measurement, and reporting. Qwest personnel will perform all on-site maintenance of the network product and equipment. Qwest employs three field agents in Wyoming and service managers. WEN routers are maintained online and a local data technician augments Qwest. School districts must provide a central point of contact (POC) for problem resolution.

Currently, the WEN is serving all K-12 districts and most, if not all, of the postsecondary institutions. Most costs are covered through legislative appropriations but some video charges are passed back to the users of

the system. Almost all service, management, and new service is the responsibility of Qwest. Estimated state employee FTE supporting the WEN is 5.

After discussing each state, the workgroup decided that none represented a model for emulation in every respect. Each has strengths and weaknesses, which provide a basis for developing a hybrid model for further consideration. Given constraints on resources, it will be important to build on what already exists or is being developed, including NETCOM aggregation efforts.

H. Summary of Preliminary Findings

- Telecommunications networks are critical to the operations of state and local public entities.
- Networks represent a large investment that is likely to grow in the future.
- Existing networks cannot achieve economies of scale.
- A different approach will be needed to promote interoperability, sharing of resources, and better utilization.
- A vision and strategy for statewide networks is needed. Without a vision or strategy, the trend of separate networks serving specific applications will likely continue.
- NETCOM aggregation efforts should form the foundation for any additional network related services.

Appendix

Network Operations	Client	Description / Purpose	Data Speeds	Future
DAS	Dept of Corrections	Data connections to all facilities (11 sites)	56K to T1 via Frame Relay	Video
DAS	County Automation	Data connections to all county courthouses	56K to T1 via Frame Relay	Upgrading to IP; fractional T1 service is needed at some sites
DAS	Dept of Education	Provides data and Internet service to 19 sites statewide	9.6BPS to T1	Fractional T1 service is needed at some sites
DAS	Health & Human Services	Data connections to 58 sites statewide	56K to T1	Fractional T1 service is needed at some sites
DAS	HHS NFOCUS	Data connections to 50 sites statewide	56K to T1	Fractional T1 service is needed at some sites
DAS	HHS WIC	Data connections to 15 sites statewide	56K with one T1	
DAS	Dept of Labor	Data connections to 17 sites statewide	56K to T1	Fractional T1 service is needed at some sites
DAS	State Patrol	Data connections to 57 law enforcement agencies		
DAS	Revenue / Property Tax	Data connections to 12 sites statewide	56K to T1	Fractional T1 service is needed at some sites
DAS	Dept of Roads	Data connections to 71sites statewide	56K to T1	Fractional T1 service is needed at some sites
DAS	State Colleges	Data and video connections to 6 sites	T1 to DS-3	Fractional T1 service is needed at some sites
DAS	24 Agencies	One or a few Network Sites into or within Lincoln		
Military Dept.	National Guard	Nebraska National Guard Distance Learning Network. Five sites connected now, with access to national system.	T1	Plans to add 3 more sites.
NETC	DOC / state agencies	Nebraska Video Conference with 34 sites in 18 cities	T1	Fractional T1 service is needed at some sites
NETC	Public	Cable Television Network -- 34 EduCable Systems Statewide	Satellite	
NETC	Public	Television Network – 9 transmitters; 16 translators	Satellite	
NETC	Schools	NEB*SAT Network 2 – 303 Digital Receive Sites in Nebraska; 200+ sites in 11 other states	Satellite	
NETC	Higher Ed and K-12 schools	NEB*SAT Network 3 -- 35 compressed video sites in 18 cities	Satellite	
NETC	Private Corporations	CorpNet Private Training Sites (24 sites in 6 cities)	Satellite	
NETC	Public	FM Radio Network – 9	Satellite / radio	

		transmitters, 5 translators (statewide coverage)	transmitters	
NETC	UNL / UNO	Fiber Optic links for distance education		
NETC	State agencies	Closed Circuit Television for University and state office buildings in Lincoln		
Central Community College	Central CC Campuses	Connects campuses education centers in 6 communities	T1 – DS3	
Metro Community College	Metro Campuses	Connects campuses or learning centers at 9 locations		
SE Community College	SECC Campuses	100 mb Ethernet and video circuit connecting three campuses and administrative offices; K-12 video connection.		
Mid Plains Community College	Mid Plains Campuses	Connects campuses or learning centers at 4 locations; K-12 video connection to N.P.		
Northeast Community Colleges	Northeast Campuses	Provides Internet connections for 3 campuses; K-12 video connection to Norfolk		
University of Nebraska	NU Campuses and offices	Provides full range of networking services for four primary campuses, extension and learning centers (6 locations) and 80+ county extension offices. Serves 50,000+ students and 15,000+ employees. The University uses about 90 meg of Internet 1 service and 130 meg of Internet 2 service. Provides Internet access to Creighton University in Omaha.		
Central NE DLC	K-12 Distance Learning	Serves 17 high schools	DS3 video and T1 data to each location.	
Crossroads DLC	K-12 Distance Learning	Serves 11 high schools	DS3 video and T1 data to each location.	
Eastern NE DLC	K-12 Distance Learning	Serves 41high schools	DS3 video and T1 data to each location.	
Niobrara Valley Tele-Partnership	K-12 Distance Learning	Serves 14 high schools	DS3 video and T1 data to each location.	
North Central DLC	K-12 Distance Learning	Serves 16 high schools	DS3 video and T1 data to each location.	
Northeast NE DLC	K-12 Distance Learning	Serves 9 high schools	DS3 video and T1 data to each location.	
Northeast NE Learner's Academy	K-12 Distance Learning	Serves 11 high schools	DS3 video and T1 data to each location.	
Sandhills Technology Education Program	K-12 Distance Learning	Serves 9 high schools	DS3 video and T1 data to each location.	
Southeast NE DLC	K-12 Distance Learning	Serves 72 high schools	100 megabit video and data to each location.	

Southwest NE DLC	K-12 Distance Learning	Serves 35 high schools	DS3 video and T1 data to each location.
Tri-Valley DLC	K-12 Distance Learning	Serves 40 high schools	Analog or DS3/T1 video and data to each location.
Western NE DLC	K-12 Distance Learning	Serves 24 high schools	DS3 video and T1 data to each location.